

Trend Study 21B-9-08

Study site name: Wide Canyon BLM.

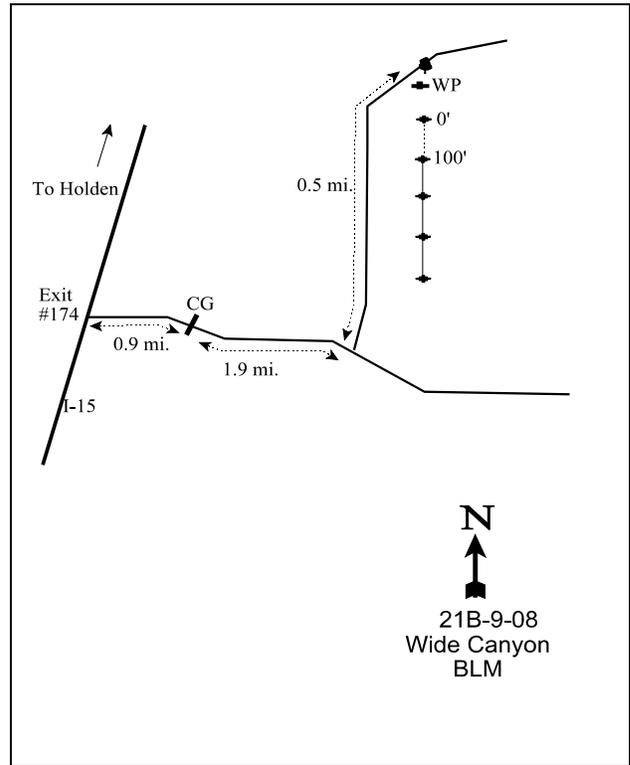
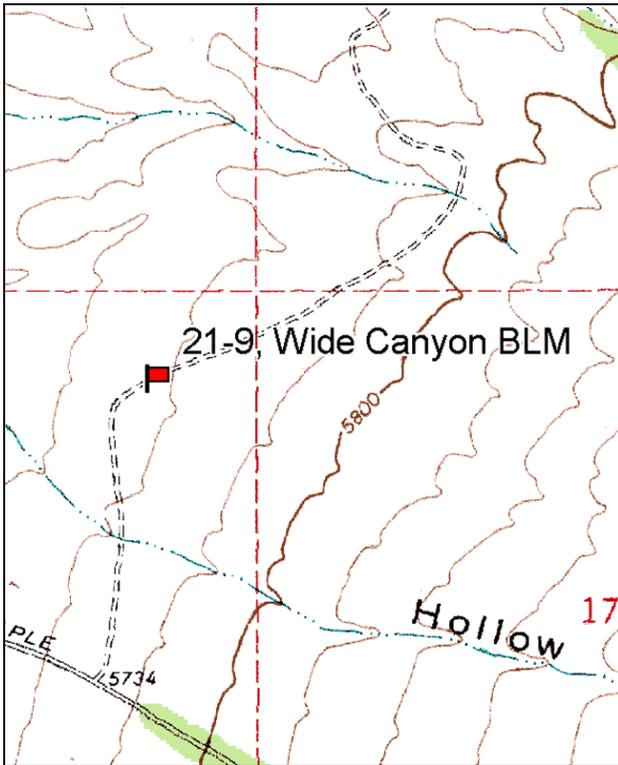
Vegetation type: Cliffrose Chaining.

Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 4 on 4ft.

LOCATION DESCRIPTION

From exit #174 on I-15 south of Holden, go 0.9 miles east to a cattleguard. Continue 1.9 miles to a dirt road turning off to the left. Follow this dirt road 0.5 miles to a witness post (rebar) 3 feet off the right side of the road, about 10 feet beyond a juniper. The frequency baseline starts 100 feet south of the witness post. The 0-foot stake is rebar with browse tag #7107 attached.



Map Name: Coffee Peak

Diagrammatic Sketch

Township 20S, Range 3W, Section 18

GPS: NAD 83, UTM 12S 394027 E, 4326278 N

DISCUSSION

Wide Canyon BLM - Trend Study No. 21B-9

Study Information

This study samples important deer winter range managed by the BLM in the Maple Hollow and Wide Canyon area [elevation: 5,720 feet (1,743 m), slope: 2%-5%, aspect: west]. An extensive area of this relatively flat bench was chained in the 1960s and is now dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and Stansbury cliffrose (*Cowania mexicana* ssp. *stansburiana*). A bullhog treatment was also implemented in 2006 to reduce Utah juniper (*Juniperus osteosperma*) density. Wildlife use, primarily by wintering mule deer, has been moderate-heavy. A DWR pellet group transect near the study estimated 87 deer days use/acre (215 ddu/ha) from 1981 to 1985 (Jense et al. 1985). Between 1986 and 1991, deer use increased to 95 days use/acre (235 ddu/ha) (Jense et al 1991). A pellet group transect read along the study baseline estimated 155 deer days use/acre (383 ddu/ha) in 1998, 167 days use/acre (413 ddu/ha) in 2003, and 140 days use/acre (346 ddu/ha) in 2008. Elk use was estimated at 13 days use/acre (33 edu/ha) in 2008. Cattle use has been light at an estimated 12 days use/acre (30 cdu/ha) in 1998, 2 days use/acre (5 cdu/ha) in 2003, and 11 days use/acre (27 cdu/ha) in 2008.

Soil

The soil is classified as a Borvant-Pahvant complex (USDA-NRCS 2008). The Borvant series consists of well-drained soils that are shallow over a petrocalcic horizon. These soils formed in alluvium or colluvium derived from limestone and sandstone. The Pahvant series consists of well-drained soils that are shallow to a calcium carbonate cemented hardpan. The soil on the study is a sandy loam with a neutral reaction (pH 6.9). Since 1998, relative combined vegetation and litter cover has been 77%-88%, and relative combined rock and pavement cover has been 7%-9%. Relative bare ground cover has been 4%-13%. The soil erosion condition was classified as stable in 2003 and 2008.

Browse

Preferred browse is provided primarily by Wyoming big sagebrush and Stansbury cliffrose, with a low density of antelope bitterbrush (*Purshia tridentata*). Sagebrush has provided 7%-14% quadrat cover since 1998. Density steadily decreased from 2,400 plants/acre in 1998 to 1,440 plants/acre in 2008. Decadence was 10%-14% of the population in 1985 and 1991, increased to 23%-25% in 1998 and 2003, and increased again to 43% in 2008. Young recruitment was high at 19%-29% of the population from 1985 to 1998, then decreased to 3% in 2003 and 2008. Vigor has been declining steadily, from 0% of the population showing poor vigor in 1985 to 18% in 2008. Average annual leader growth was 2.0 inches (5.1 cm) in 2003 and 1.3 inches (3.4 cm) in 2008.

Stansbury cliffrose has provided 4%-7% quadrat cover since 1998. Density increased from 180 plants/acre in 1998 and 160 plants/acre in 2003 to 480 plants/acre in 2008. Decadent plants comprised 13%-17% of the population in 1985, 1991, and 2008, and 0% in 1998 and 2003. Young recruitment decreased from 20% of the population in 1985 to 0% in 1998 and 2003, then increased to 50% by 2008. Vigor has been excellent. Browse use was moderate in 1985, light-moderate in 1991 and 1998, moderate-heavy in 2003, and mostly light in 2008. The average height of mature plants in the population has been increasing from 4.0 feet (1.2 m) in 1985 to 7.4 feet (2.3 m) in 2008, making many individuals unavailable for browsing.

Juniper provided 6% canopy cover in 1998 and 2003, and 0% in 2008 following the bullhog treatment. Point-centered quarter density estimates were 32 trees/acre in 2003 and 23 trees/acre in 2008. Average trunk diameter was 6.2 inches (15.7 cm) in 2003 and 5.7 inches (14.9 cm) in 2008.

Herbaceous Understory

Total grass cover was 18% in 1998, 27% in 2003, and 23% in 2008, however, 70%-85% of that cover was

provided by cheatgrass (*Bromus tectorum*). This species was sampled in 100% of the quadrats in 1998 and 98% in 2003 and 2008. The majority of the perennial grass cover has been provided by Sandberg bluegrass (*Poa secunda*), crested wheatgrass (*Agropyron cristatum*), and bulbous bluegrass (*Poa bulbosa*).

The forb component is also dominated by annuals. Total forb cover was 2% in 1998, 12% in 2003, and 8% in 2008. Pepperweed (*Lepidium sp.*) was the most abundant forb in 1998, providing 65% of the total forb cover. Storksbill (*Erodium cicutarium*) was the most abundant forb in 2003 and 2008, providing 95% and 85% of the total forb cover, respectively. Bur buttercup (*Ranunculus testiculatus*) is present but less abundant. Perennial forbs are sparse and have provided less than 1% cover since 1998. Species sampled include prickly lettuce (*Lactuca serriola*), death camas (*Zigadenus paniculatus*), milkvetch (*Astragalus sp.*), and false dandelion (*Agoseris glauca*).

1991 TREND ASSESSMENT

The trend for browse is stable. Sagebrush density remained similar to 1985 at 1,400 plants/acre. Decadence decreased slightly from 14% of the population to 10%, and young recruitment also decreased from 29% of the population to 19%. Plants displaying poor vigor increased slightly from 0% of the population to 5%. Cliffrose density decreased from 999 plants/acre to 865 plants/acre. Decadence remained relatively stable at 15% of the population, and young recruitment decreased from 20% of the population to 8%. Vigor remained excellent. The trend for grass is stable. The sum of nested frequency for perennial grasses changed little. The trend for forbs is slightly up. No forbs were sampled in 1985, and five species were sampled in 1991, although in very low frequencies.

browse - stable (0)

grass - stable (0)

forb - slightly up (+1)

1998 TREND ASSESSMENT

The trend for browse is stable. Density changes may have been related to the larger sample area in 1998, therefore, the trend was determined using other parameters. Sagebrush decadence increased from 10% of the population to 23%, however, young recruitment also increased from 19% of the population to 26%. Vigor remained similar to 1991 with 6% of the population exhibiting poor vigor. Cliffrose decadence decreased from 15% of the population to 0%, but young recruitment also decreased from 8% of the population to 0%. Vigor remained good on all sampled plants. The trend for grass is stable. The sum of nested frequency for perennial grasses remained stable. The trend for forbs is slightly down. Almost no perennial forbs were sampled. The winter range condition, determined by the Desirable Components Index (DCI), was rated as fair due to moderate preferred browse cover with low decadence and moderate recruitment, low perennial herbaceous cover, and high cheatgrass cover.

winter range condition (DCI) - fair (31) Low potential scale

browse - stable (0)

grass - stable (0)

forb - slightly down (-1)

2003 TREND ASSESSMENT

The trend for browse is slightly down. Sagebrush density decreased 21%, and decadence remained moderate at 25% of the population. Young recruitment decreased from 26% of the population to 3%, and plants displaying poor vigor increased from 6% of the population to 13%. Cliffrose density decreased 11%, and decadence and young recruitment both remained at 0% of the population. Vigor remained excellent. The trend for grass is up. The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, increased 46%, and cheatgrass decreased significantly in nested frequency. Sandberg bluegrass and bulbous bluegrass increased significantly in nested frequency. The trend for forbs is stable. The sum of nested frequency for perennial forbs increased slightly. However, storksbill increased significantly in nested frequency, and quadrat frequency increased from 9% to 69%. Bur buttercup and slender phlox (*Microsteris gracilis*) decreased significantly in nested frequency. The DCI rating remained fair.

winter range condition (DCI) - fair (39) Low potential scale
 browse - slightly down (-1) grass - up (+2) forb - stable (0)

2008 TREND ASSESSMENT

The trend for browse is slightly down. Sagebrush density decreased 24%, and decadence increased from 25% of the population to 43%. Young recruitment remained low at 3% of the population. Plants displaying poor vigor increased slightly from 13% of the population to 18%. Cliffrose density increased three-fold, however, decadence also increased from 0% of the population to 17%. Young recruitment increased from 0% of the population to 50%. Vigor declined slightly, from 0% of the population showing poor vigor to 4%. The trend for grass is stable. The sum of nested frequency for perennial grasses changed little. The trend for forbs is stable. The sum of nested frequency for perennial forbs changed little. Storksbill decreased significantly in nested frequency, while pale alyssum (*Alyssum alyssoides*) and prickly lettuce increased significantly in nested frequency. The DCI rating remained fair.

winter range condition (DCI) - fair (28) Low potential scale
 browse - slightly down (-1) grass - stable (0) forb - stable (0)

HERBACEOUS TRENDS --
 Management unit 21B, Study no: 9

| Type | Species | Nested Frequency | | | | | Average Cover % | | |
|-----------------------------|---------------------------------|------------------|------|------|------|------|-----------------|-------|-------|
| | | '85 | '91 | '98 | '03 | '08 | '98 | '03 | '08 |
| G | <i>Agropyron cristatum</i> | ab19 | b36 | ab24 | a8 | ab25 | .90 | .26 | .52 |
| G | <i>Bromus tectorum</i> (a) | - | - | b370 | a329 | a336 | 15.22 | 19.06 | 17.58 |
| G | <i>Carex</i> sp. | - | - | - | 3 | - | - | .15 | - |
| G | <i>Poa bulbosa</i> | a- | a- | a3 | b29 | b23 | .00 | .83 | 1.01 |
| G | <i>Poa secunda</i> | a130 | a114 | a102 | b198 | b175 | 1.32 | 7.09 | 3.40 |
| G | <i>Sitanion hystrix</i> | b11 | bc15 | c34 | a- | ab11 | .39 | - | .12 |
| Total for Annual Grasses | | 0 | 0 | 370 | 329 | 336 | 15.22 | 19.06 | 17.58 |
| Total for Perennial Grasses | | 160 | 165 | 163 | 238 | 234 | 2.63 | 8.34 | 5.05 |
| Total for Grasses | | 160 | 165 | 533 | 567 | 570 | 17.85 | 27.40 | 22.64 |
| F | <i>Agoseris glauca</i> | - | 8 | - | 5 | - | - | .03 | - |
| F | <i>Alyssum alyssoides</i> (a) | - | - | a- | a5 | b42 | - | .18 | .78 |
| F | <i>Astragalus</i> sp. | - | - | 3 | - | - | .15 | - | - |
| F | <i>Calochortus nuttallii</i> | - | 4 | - | 5 | - | - | .01 | - |
| F | <i>Chenopodium</i> sp. (a) | - | - | 2 | - | - | .00 | - | - |
| F | <i>Collinsia parviflora</i> (a) | - | - | 34 | 31 | 15 | .18 | .14 | .05 |
| F | <i>Descurainia pinnata</i> (a) | - | - | - | 1 | - | - | .00 | - |
| F | <i>Erodium cicutarium</i> (a) | - | - | a25 | c217 | b189 | .12 | 11.55 | 6.40 |
| F | <i>Lactuca serriola</i> | a- | bc10 | a- | ab3 | c23 | - | .03 | .25 |
| F | <i>Lepidium</i> sp. (a) | - | - | b218 | a- | a5 | 1.14 | - | .02 |
| F | <i>Microsteris gracilis</i> (a) | - | - | b18 | a5 | a2 | .07 | .01 | .00 |
| F | <i>Montia perfoliata</i> (a) | - | - | a- | b19 | a- | - | .07 | - |

| Type | Species | Nested Frequency | | | | | Average Cover % | | |
|---------------------------|-----------------------------|------------------|-----|-----------------|----------------|-----------------|-----------------|-------|------|
| | | '85 | '91 | '98 | '03 | '08 | '98 | '03 | '08 |
| F | Phacelia sp. | - | - | - | 8 | - | - | .04 | - |
| F | Phlox longifolia | - | 1 | - | 3 | - | - | .00 | - |
| F | Ranunculus testiculatus (a) | - | - | _b 26 | _a 9 | _a 11 | .06 | .02 | .04 |
| F | Tragopogon dubius | - | 1 | 2 | - | - | .00 | - | - |
| F | Zigadenus paniculatus | - | - | - | 1 | - | .00 | .00 | - |
| Total for Annual Forbs | | 0 | 0 | 323 | 287 | 264 | 1.59 | 11.98 | 7.31 |
| Total for Perennial Forbs | | 0 | 24 | 5 | 25 | 23 | 0.16 | 0.12 | 0.25 |
| Total for Forbs | | 0 | 24 | 328 | 312 | 287 | 1.75 | 12.10 | 7.56 |

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 21B, Study no: 9

| Type | Species | Strip Frequency | | | Average Cover % | | |
|------------------|------------------------------------|-----------------|-----|-----|-----------------|-------|-------|
| | | '98 | '03 | '08 | '98 | '03 | '08 |
| B | Artemisia tridentata wyomingensis | 68 | 63 | 48 | 9.60 | 13.78 | 7.36 |
| B | Chrysothamnus nauseosus hololeucus | 6 | 4 | 3 | .56 | .00 | 1.01 |
| B | Cowania mexicana stansburiana | 8 | 8 | 13 | 3.72 | 6.86 | 4.83 |
| B | Gutierrezia sarothrae | 60 | 8 | 9 | 6.02 | .06 | .18 |
| B | Juniperus osteosperma | 3 | 3 | 0 | 1.54 | 2.34 | - |
| B | Opuntia sp. | 1 | 1 | 0 | .00 | .00 | - |
| B | Purshia tridentata | 0 | 0 | 0 | .03 | - | - |
| Total for Browse | | 146 | 87 | 73 | 21.49 | 23.06 | 13.40 |

CANOPY COVER, LINE INTERCEPT --

Management unit 21B, Study no: 9

| Species | Percent Cover | | |
|---|---------------|-------|-------|
| | '98 | '03 | '08 |
| <i>Artemisia tridentata wyomingensis</i> | - | 10.00 | 7.83 |
| <i>Chrysothamnus nauseosus hololeucus</i> | - | .35 | .76 |
| <i>Cowania mexicana stansburiana</i> | - | 11.53 | 13.01 |
| <i>Gutierrezia sarothrae</i> | - | - | .45 |
| <i>Juniperus osteosperma</i> | 6.00 | 5.86 | - |
| <i>Opuntia sp.</i> | - | .13 | - |

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 21B, Study no: 9

| Species | Average leader growth (in) | |
|--|----------------------------|-----|
| | '03 | '08 |
| <i>Artemisia tridentata wyomingensis</i> | 2.0 | 1.3 |

POINT-QUARTER TREE DATA --

Management unit 21B, Study no: 9

| Species | Trees per Acre | | | Average diameter (in) | | |
|------------------------------|----------------|-----|-----|-----------------------|-----|-----|
| | '98 | '03 | '08 | '98 | '03 | '08 |
| <i>Juniperus osteosperma</i> | 33 | 22 | 23 | 7.4 | 6.2 | 5.7 |

BASIC COVER --

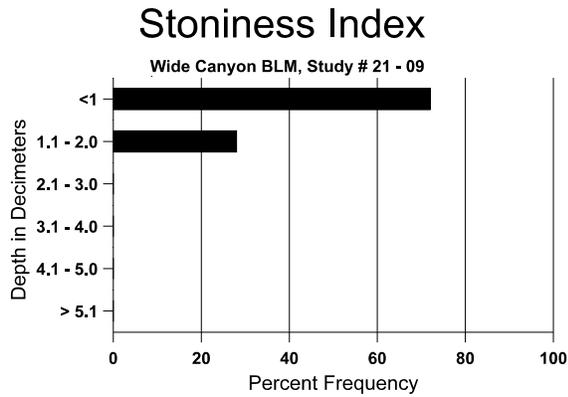
Management unit 21B, Study no: 9

| Cover Type | Average Cover % | | | | |
|-------------|-----------------|-------|-------|-------|-------|
| | '85 | '91 | '98 | '03 | '08 |
| Vegetation | 2.50 | 2.00 | 48.18 | 58.09 | 49.73 |
| Rock | 4.75 | 5.50 | 10.57 | 10.47 | 8.21 |
| Pavement | .50 | .25 | 1.12 | .21 | .36 |
| Litter | 68.00 | 59.25 | 56.50 | 34.65 | 49.05 |
| Cryptogams | .25 | .75 | 2.17 | 1.46 | .01 |
| Bare Ground | 24.00 | 32.25 | 9.02 | 16.09 | 4.86 |

SOIL ANALYSIS DATA --

Management unit 21, Study no: 9, Study Name: Wide Canyon BLM

| Effective rooting depth (in) | Temp °F (depth) | pH | sandy loam | | | %OM | PPM P | PPM K | ds/m |
|------------------------------|-----------------|-----|------------|-------|-------|-----|-------|-------|------|
| | | | %sand | %silt | %clay | | | | |
| 5.8 | 55.2 (13.1) | 6.9 | 56.7 | 25.7 | 17.6 | 2.9 | 18.4 | 163.2 | 0.7 |



PELLET GROUP DATA --

Management unit 21B, Study no: 9

| Type | Quadrat Frequency | | |
|--------|-------------------|-----|-----|
| | '98 | '03 | '08 |
| Rabbit | 22 | 22 | 40 |
| Grouse | - | - | 1 |
| Elk | - | 1 | 6 |
| Deer | 60 | 58 | 73 |
| Cattle | 1 | 5 | 1 |

| Days use per acre (ha) | | |
|------------------------|-----------|-----------|
| '98 | '03 | '08 |
| - | - | - |
| - | - | - |
| - | - | 13 (33) |
| 155 (383) | 167 (413) | 140 (346) |
| 12 (30) | 2 (5) | 11 (27) |

BROWSE CHARACTERISTICS --

Management unit 21B, Study no: 9

| | | Age class distribution (plants per acre) | | | | | Utilization | | | | | |
|--|---------------------------------------|--|-------|--------|----------|------|-------------|---------|------------|---------|--------------|---------------------------|
| Year | Plants per Acre (excluding seedlings) | Seedling | Young | Mature | Decadent | Dead | % moderate | % heavy | % decadent | % dying | % poor vigor | Average Height Crown (in) |
| <i>Artemisia tridentata wyomingensis</i> | | | | | | | | | | | | |
| 85 | 1397 | - | 399 | 799 | 199 | - | 5 | 0 | 14 | - | 0 | 30/33 |
| 91 | 1398 | - | 266 | 999 | 133 | - | 38 | 0 | 10 | 1 | 5 | 29/50 |
| 98 | 2400 | 60 | 620 | 1240 | 540 | 540 | 23 | 0 | 23 | 5 | 6 | 31/39 |
| 03 | 1900 | - | 60 | 1360 | 480 | 460 | 35 | 25 | 25 | 13 | 13 | 28/36 |
| 08 | 1440 | - | 40 | 780 | 620 | 580 | 18 | 3 | 43 | 15 | 18 | 32/37 |

| | | Age class distribution (plants per acre) | | | | | Utilization | | | | | |
|---|---------------------------------------|--|-------|--------|----------|------|-------------|---------|------------|---------|--------------|---------------------------|
| Year | Plants per Acre (excluding seedlings) | Seedling | Young | Mature | Decadent | Dead | % moderate | % heavy | % decadent | % dying | % poor vigor | Average Height Crown (in) |
| Chrysothamnus nauseosus hololeucus | | | | | | | | | | | | |
| 85 | 0 | - | - | - | - | - | 0 | 0 | 0 | - | 0 | -/- |
| 91 | 0 | - | - | - | - | - | 0 | 0 | 0 | - | 0 | -/- |
| 98 | 140 | - | - | 120 | 20 | - | 14 | 0 | 14 | - | 0 | 29/43 |
| 03 | 80 | - | - | 60 | 20 | 40 | 0 | 75 | 25 | - | 0 | 20/26 |
| 08 | 60 | - | - | 60 | - | - | 0 | 0 | 0 | - | 0 | 26/38 |
| Cowania mexicana stansburiana | | | | | | | | | | | | |
| 85 | 998 | - | 199 | 666 | 133 | - | 73 | 7 | 13 | - | 0 | 48/49 |
| 91 | 865 | - | 66 | 666 | 133 | - | 54 | 0 | 15 | - | 0 | 56/58 |
| 98 | 180 | - | - | 180 | - | 40 | 33 | 0 | 0 | - | 0 | 83/91 |
| 03 | 160 | - | - | 160 | - | - | 25 | 50 | 0 | - | 0 | 82/89 |
| 08 | 480 | - | 240 | 160 | 80 | - | 13 | 17 | 17 | - | 4 | 89/96 |
| Gutierrezia sarothrae | | | | | | | | | | | | |
| 85 | 1331 | - | 666 | 599 | 66 | - | 0 | 5 | 5 | - | 5 | 10/13 |
| 91 | 2265 | - | 599 | 1666 | - | - | 0 | 0 | 0 | - | 0 | 13/16 |
| 98 | 5720 | - | 100 | 5620 | - | - | 0 | 0 | 0 | - | 0 | 13/17 |
| 03 | 220 | - | 20 | 200 | - | - | 0 | 0 | 0 | - | 0 | 5/5 |
| 08 | 300 | 20 | 20 | 280 | - | 80 | 0 | 0 | 0 | - | 0 | 11/18 |
| Juniperus osteosperma | | | | | | | | | | | | |
| 85 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 91 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 98 | 60 | - | - | 60 | - | 20 | 0 | 0 | - | - | 0 | -/- |
| 03 | 60 | - | - | 60 | - | 20 | 0 | 0 | - | - | 0 | -/- |
| 08 | 0 | - | - | - | - | 20 | 0 | 0 | - | - | 0 | -/- |
| Opuntia sp. | | | | | | | | | | | | |
| 85 | 199 | - | - | 199 | - | - | 0 | 0 | 0 | - | 0 | 6/8 |
| 91 | 132 | - | - | 66 | 66 | - | 0 | 0 | 50 | - | 0 | 8/15 |
| 98 | 20 | 20 | - | 20 | - | - | 0 | 0 | 0 | - | 0 | 6/12 |
| 03 | 20 | - | - | 20 | - | - | 0 | 0 | 0 | - | 0 | 6/14 |
| 08 | 0 | - | - | - | - | - | 0 | 0 | 0 | - | 0 | 7/18 |
| Purshia tridentata | | | | | | | | | | | | |
| 85 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 91 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 98 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | 91/93 |
| 03 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 08 | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |